

so much time, labour, and ingenuity had not been more usefully employed!

MICROSCOPIC STRUCTURE OF SCOTTISH ROCKS.—Students of petrography may be interested to know that Mr. Bryson, of Edinburgh, has prepared for sale a series of sections of typical Scottish rocks, which have been selected for him by Prof. Geikie. They illustrate some of the most characteristic aqueous, igneous, and metamorphic rocks of Scotland. They are thirty in number.

MYTHOLOGIC PHILOSOPHY¹ II.

RAIN.—The Shoshoni philosopher believes the domed firmament to be ice, and surely it is the very colour of ice, and he believes further that a monster serpent-god coils his huge back to the firmament, and with his scales abrades its face and causes the ice-dust to fall upon the earth. In the winter time it falls as snow, but in the summer time it melts and falls as rain, and the Shoshoni philosopher actually sees the serpent of the storm in the rainbow of many colours.

The Oraibi philosopher who lives in a pueblo is acquainted with architecture, and so his world is seven-storied. There is a world below, and five worlds above this one. Muingwa, the rain god who lives in the world immediately above, dips his great brush, made of feathers of the birds of the heavens, into the lakes of the skies, and sprinkles the earth with refreshing rain for the irrigation of the crops tilled by these curious Indians who live on the cliffs of Arizona. In winter Muingwa crushes the ice of the lakes of the heavens, and scatters it over the earth, when we have a snow-fall.

The Hindoo philosopher says that the lightning-bearded Indra breaks the vessels that hold the waters of the skies with his thunderbolts, and the rains descend to irrigate the earth.

The philosopher of civilisation expounds to us the methods by which the waters are evaporated from the land and the surface of the sea, and carried away by the winds and gathered into clouds, to be discharged again upon the earth, keeping up for ever that wonderful circulation of water from the heavens to the earth and from the earth to the heavens, that orderly succession of events in which the waters travel by river, by sea, and by cloud.

Migration of Birds.—The Algonkin philosopher explains the migration of birds by relating the myth of the combat between Ka-bi-no-ke and Shingapis, the prototype or progenitor of the water-hen, one of their animal gods. A fierce battle raged between Ka-bi-no-ke and Shingapis, but the latter could not be conquered.

All the birds were driven from the land but Shingapis, and then was it established that, whenever in the future Winternaker should come with his cold winds, fierce snows, and frozen waters, all the birds should leave for the south except Shingapis and his friends. So the birds that spend their winters north are called by the Algonkin philosophers "the friends of Shingapis."

In contrast to this explanation of the flight of birds may be placed the explanation of the modern evolutionist, who says that the birds migrate in quest of abundance of food and a genial climate, guided by an instinct of migration which is a cumulation of inherited memories.

Diversity of Languages.—The Kaibabit philosopher accounts for the diversity of languages in this manner: Si-chom-pa Ma-so-its, the grandmother goddess of the Sea, brought up mankind from beneath the waves in a sack, which she delivered to the Shinau-av brothers, the great wolf-gods of his mythology, and told them to carry it from the shores of the sea to the Kaibab Plateau, and there to open it, but they were by no means to open the package ere their arrival, lest some great disaster should befall.

The curiosity of the younger Shinau-av overcame him, and he untied the sack and the people swarmed out, but the elder Shinau-av, the wiser god, ran back and closed the sack while yet not all the people had escaped, and they carried the sack with its remaining contents to the plateau and there opened it.

Those that remained in the sack found a beautiful land, a great plateau covered with mighty forests, through which elk, deer, and antelopes roamed in abundance, and many mountain sheep were found on the bordering crags; *pive*, the nuts of the edible pine, they found on the foot-hills, and *use*, the fruit of the

Yucca, in sunny glades, and *nant*, the *meschal* crowns, for their feasts, and *chuar*, the cactus-apple, from which to make their wine; reeds grew about the lakes for their arrow-shafts; the rocks were full of flints for their barbs and knives, and away down in the cañon they found a pipestone quarry, and on the hills they found arrarumpive, their tobacco.

Oh! it was a beautiful land that was given to these, the favourites of the gods. The descendants of these people are the present Kaibabits of Northern Arizona. Those who escaped by the way, through the wicked curiosity of the younger Shinau-av, scattered over the country and became Navahoes, Moquis, Sioux, Comanches, Spaniards, Americans—poor, sorry fragments of people, without the original language of the gods, and only able to talk in imperfect jargons.

The Hebrew philosopher tells us that on the plains of Shinar the people of the world were gathered to build a city and erect a tower, the summit of which should reach above the waves of any flood Jehovah might send. But their tongues were confused, as a punishment for their impiety.

The philosopher of science tell us that mankind was widely scattered over the earth anterior to the development of articulate speech, that the languages of which we are cognisant sprang from innumerable centres as each little tribe developed its own language, and that in the study of any language an orderly succession of events may be discovered in its evolution from a few holophrastic locutions to a complex language, with a multiplicity of words and an elaborate grammatic structure, by the differentiation of the parts of speech and the integration of the sentence.

Mythologic Philosophy has Four Stages.—Mythologic philosophy is the subject with which we deal. Its method, as stated in general terms, is this: All phenomena of the outer objective world are interpreted by comparison with those of the inner subjective world. Whatever happens, some one does it. That some one has a will, and works as he wills. The basis of the philosophy is personality. The persons who do the things we observe in the phenomena of the universe, are the gods of mythology—the *cosmos* is a *pantheon*. Under this system, whatever may be the phenomena observed, the philosopher asks, "Who does it? and why?" and the answer comes, "A god with his design." The winds blow and the interrogatory is answered, "Æolus frees them from the cave to speed the ship of a friend, or destroy the vessel of a foe."

The actors in mythologic philosophy are gods. In the character of these gods four stages of philosophy may be discovered. In the lowest and earliest stage everything has life, everything is endowed with personality, will, and design; animals are endowed with all the wonderful attributes of mankind; all inanimate objects are believed to be animate; trees think and speak; stones have loves and hates; hills and mountains, springs and rivers, and all the bright stars have life. Everything discovered objectively by the senses is looked upon subjectively by the philosopher and endowed with all the attributes supposed to be inherent in himself. In this stage of philosophy everything is a god. Let us call it *hecatostheism*. In the second stage men no longer attribute life indiscriminately to inanimate things, but the same powers and attributes recognised by subjective vision in man are attributed to the animals by which he is surrounded. No line of demarcation is drawn between man and beast; all are great beings endowed with wonderful attributes. Let us call this stage *zootheism*, when men worship beasts. All the phenomena of nature are the doings of these animal gods; all the facts of nature, all the phenomena of the known universe, all the institutions of humanity known to the philosophers of this stage, are accounted for in the mythologic history of these zoomorphic gods.

In the third stage a wide gulf is placed between man and the lower animals. The animal gods are dethroned, and the powers and phenomena of nature are personified and deified. Let us call this stage *physitheism*. The gods are strictly anthropomorphic, having the form as well as the mental, moral, and social attributes of men. Thus we have a god of the sun, a god of the moon, a god of the air, a god of dawn, and a deity of the night. In the fourth stage, mental, moral, and social characteristics are personified and deified. Thus we have a god of war, a god of love, a god of revelry, a god of plenty, and like personages who preside over the institutions and occupations of mankind. Let us call this *psychotheism*. With the mental, moral, and social characteristics in these gods are associated the powers of nature, and they differ from nature gods, chiefly in that they have more distinct psychic characteristics. Psychotheism

¹ From Vice-Presidential Address of Prof. J. W. Powell, of Washington, Vice-President Section B, American Association for the Advancement of Science, Saratoga Meeting, August, 1879. Continued from p. 314.

by the processes of mental integration develops in one direction into monotheism, and in the other into pantheism. When the powers of nature are held predominant in the minds of the philosopher through whose cogitations this evolution of theism is carried on, pantheism, as the highest form of psychotheism, is the final result; but when the moral qualities are held in highest regard in the minds of the men in whom this process of evolution is carried on, *monotheism*, or a god whose essential characteristics are moral qualities, is the final product. The monotheistic god is not nature, but presides over and operates through nature.

Psychotheism has long been recognised. All of the earlier literature of mankind treats largely of these gods, for it is an interesting fact that in the history of any civilised people the evolution of psychotheism is approximately synchronous with the invention of an alphabet. In the earliest writings of the Hebrews, the Egyptians, the Hindoos, and the Greeks, this stage is discovered, and Jehovah, Osiris, Indra, and Zeus are characteristic representatives. As psychotheism and written language appear together in the evolution of culture, this stage of theism is, consciously or unconsciously, a part of the theme of all written history.

The palæontologist, in studying the rocks of the hill and the cliffs of the mountain, discovers in inanimate stones the life forms of the ancient earth. The geologist, in the study of the structure of valleys and mountains, discovers groups of facts that lead him to a knowledge of more ancient mountains and valleys and seas, of geographic features long ago buried, and followed by a new land with new mountains and valleys and new seas. The philologist, in studying the earliest writings of a people, not only discovers the thoughts purposely recorded in those writings, but is able to go back in the history of the people many generations, and discover with even greater certainty the thoughts of the more ancient people who made the words.

Thus the writings of the Greeks, the Hindoos, the Egyptians, and the Hebrews, that give an account of their psychic gods, also contain a description of an earlier theism unconsciously recorded by the writers themselves. Psychotheism prevailed when the sentences were coined, physitheism when the words were coined. So the philologist discovers physitheism in all ancient literature. But the verity of that stage of philosophy does not rest alone upon the evidence derived from the study of fossil philosophies through the science of philology. In the folk-lore of every civilised people having a psychotheic philosophy, an earlier philosophy, with nature gods, is discovered.

The different stages of philosophy which I have attempted to characterise have never been found in purity. We always observe different methods of explanation existing side by side, and the type of a philosophy is determined by the prevailing characteristics of its explanations of phenomena. Fragments of earlier are always found side by side with the greater body of the later philosophy. Man has never clothed himself in new garments of wisdom, but has for ever been patching the old, and the old and the new are blended in the same pattern, and thus we have *atavism* in philosophy. So in the study of any philosophy which has reached the psychotheic age, patches of the earlier philosophy are always seen. Ancient nature gods are found to be living and associating with the supreme psychic deities.

Thus in anthropological science there are three ways by which to go back in the history of any civilised people and learn of its barbaric physitheism. But of the verity of the stage we have further evidence. When Christianity was carried north from Central Europe, the champions of the new philosophy, and its consequent religion, discovered, among those who dwelt by the glaciers of the north, a barbaric philosophy which they have preserved to history in the Eddas and Sagas, and Norse literature is full of a philosophy in a transition state, from physitheism to psychotheism; and mark the people discovered in this transition state were inventing an alphabet—they were carving Runes.

Then a pure physitheism was discovered in the Aztec barbarism of Mexico, and elsewhere on the globe many people were found in that stage of culture to which this philosophy properly belongs. Thus the existence of physitheism as a stage of philosophy is abundantly attested. Comparative mythologists are agreed in recognising these two stages. They might not agree to throw all of the higher and later philosophies into one group, as I have done, but all recognise the plane of demarcation between the higher and lower groups as I have drawn it. Scholars, too, have

come essentially to an agreement that physitheism is earlier and older than psychotheism.

Perhaps there may be left a "doubting Thomas" who believes that the highest stage of psychotheism—that is, monotheism—was the original basis for the philosophy of the world, and that all other forms are degeneracies from that primitive and perfect state. If there be such a man left, to him what I have to say about philosophy is blasphemy.

Again, all students of comparative philosophy, or comparative mythology, or comparative religion, as you may please to approach this subject from different points of view, recognise that there is something else: that there are philosophies, or mythologies, or religions, not included in the two great groups. All that something has been vaguely called *fetichism*.

I have divided it into two parts—*hecatostheism* and *zootheism*. The verity of zootheism as a stage of philosophy rests on abundant evidence. In psychotheism it appears as *devilism* in obedience to a well-known law of comparative theology, viz., that the gods of a lower and superseded stage of culture oftentimes become the devils of a higher stage.

So in the very highest stage of psychotheism we find beast devils. In Norse mythology we have Fenris, the wolf, and Jormungander, the serpent. Dragons appear in Greek mythology, the bull is an Egyptian god, a serpent is found in Zenda-vesta; and was there not a scaly fellow in the Garden of Eden? So common are these beast-demons in the higher mythologies that they are used in every literature as rhetorical figures. So we find, as a figure of speech, the great red dragon with seven heads and ten horns, with tail that with one brush sweeps away a third of the stars of heaven. And wherever we find nature worship we find it accompanied with beast worship. In the study of higher philosophies, having learned that lower philosophies often exist side by side with them, we might legitimately conclude that a philosophy based upon animal gods had existed previous to the development of physitheism, and philologic research leads to the same conclusion.

But we are not left to base this conclusion upon an induction only, for in the examination of savage philosophies we actually discover zootheism in all its proportions. Many of the Indians of North America, and many of South America, and many of the tribes of Africa, are found to be zootheists. Their supreme gods are animals—tigers, bears, wolves, serpents, birds. Having discovered this, with a vast accumulation of evidence, we are enabled to carry philosophy back one stage beyond physitheism, and can confidently assert that all the philosophies of civilisation have come up through these three stages.

And yet there are fragments of philosophy discovered which are not zootheistic, physitheistic, nor psychotheistic. What are they? We find running through all three stages of higher philosophy that phenomena are sometimes explained by regarding them as the acts of persons who do not belong to any of the classes of gods found in the higher stages. We find fragments of philosophy everywhere which seem to assume that all inanimate nature is animate; that mountains and hills, and rivers and springs, that trees and grasses, that stones, and all fragments of things are endowed with life, and with will, and act for a purpose. These fragments of philosophy lead to the discovery of *hecatostheism*.

Philology also leads us back to that state when the animate and inanimate were confounded; for the holophrastic roots into which words are finally resolved show us that all inanimate things were represented in language as actors.

Such is the evidence on which we predicate the existence of hecatostheism as a veritable stage of philosophy. Unlike the three higher stages, it has no people extant on the face of the globe known to be in this stage of culture. The philosophies of many of the lowest tribes of mankind are yet unknown, and hecatostheism may be discovered, but, at the present time we are not warranted in saying that any tribe entertains this philosophy as its highest wisdom.

THE NATURE OF ELECTRICITY¹

ON surveying the wide sea upon which the numerous and varied practical applications of electricity are launched for the subject of this evening's address, I have been puzzled to steer a course that shall avoid the dazzling shoals of theory on the one hand, and the dry hard rocks of practice on the other.

¹ Abstract of the Inaugural address to the Society of Telegraph Engineers, by Mr. William Henry Preece (President), delivered January 28, 1880. Revised by the Author.